ARAC FTHWG Report

Flight in Icing Requirements

1 - What is the underlying safety issue addressed by the FAR/JAR?

Section 25.1419 broadly addresses safe airplane operation in the continuous maximum and intermittent maximum icing conditions of appendix C. However, existing Part 25, Subpart B does not contain any specific flight test requirements to ensure the ability of airplanes to safely operate in these icing conditions. The proposed regulations and advisory material developed by the FTHWG provides harmonized FAR 25/JAR-25 airplane performance and handling characteristics certification requirements to ensure safe airplane operation in the appendix C icing conditions.

2 - What are the current FAR and JAR standards?

The only pertinent regulatory text in current FAR 25 and JAR-25 is contained in a Subpart F requirement (§ 25.1419) related to ice protection systems.

Current FAR text: **If certification with ice protection provisions is desired, the airplane must be able to safely operate in the continuous maximum and intermittent maximum icing conditions of appendix C.**

Current JAR text: **If certification for flight in icing conditions is desired, the aeroplane must be able to safely operate in the continuous maximum and intermittent maximum icing conditions of appendix C.**

In addition, the JAA has applied Notice of Proposed Amendment (NPA) 25F-219 to certification projects over the last ten years. [NPA 25F-219 presents Draft Advisory Material Joint (AMJ) 25.1419 entitled "Flight in Icing Conditions - Acceptable Handling Characteristics and Performance Effects."]

3 - What are the differences in the standards and what do these differences result in?:

The FAR 25 standard is poorly worded since it makes the demonstration of an airplane's ability to safely operate in icing conditions contingent solely upon the desire of the applicant to certificate an ice protection system. The JAR-25.1419 requirement is correctly worded, relating the demonstration of safe operation in icing conditions to the applicant's desire to have the airplane certificated for flight in icing. Despite the differences in wording, the regulations have been applied in a similar manner over the years. The greatest difference has occurred within the last ten years with the JAA's application of NPA 25F-219 to all certification projects. This NPA contains significant new material for airplane performance and handling characteristics in icing conditions. Comments provided to JAA regarding this NPA strongly argued for developing harmonized FAA-JAA requirements for flight in icing conditions. Finally,

a problem that exists in the FAA use of § 25.1419 for icing certifications is that no standardized criteria have been developed and applied to define what is meant by "to safely operate" in terms of performance and handling characteristics.

4 - What, if any, are the differences in the means of compliance?

Considerable differences exist in the means of compliance with FAR 25 and JAR-25 certification requirements for flight in icing. As noted above, this has largely been due to the application of the advisory material contained in NPA 25F-219, which defines "to safely operate" in terms of airplane performance and handling characteristics.

5 – What is the proposed action?

The proposed action is to adopt new rulemaking and advisory material developed by the FTHWG. Specifically, the FTHWG has developed a set of Subpart B performance and handling characteristics requirements for flight in the icing conditions of Appendix C that are based on the material contained in JAA NPA 25F-219. The FTHWG proposal also adopts the introductory wording of JAR-25.1419 and adds the definition of ice accretions appropriate to various phases of flight in Appendix C.

6 - What should the harmonized standard be?

The harmonized standards should be those developed by the FTHWG, which are provided as Attachment 1. Note that this activity predates the Fast Track program, and therefore the attachment includes preamble material.

7 - How does this proposed standard address the underlying safety issue (identified under #1)?

The proposed standards provide a comprehensive set of regulatory criteria, including definition of ice accretions in addition to specific performance and handling characteristics requirements, to ensure safe operation of transport category airplanes in icing conditions.

8 - Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety? Explain.

Relative to the current FAR, the proposed standard increases the level of safety. The current FAR states a very general safety objective (i.e., the airplane must be able to safely operate) that is open to interpretation; the proposed standard defines specific requirements that must be met to obtain certification for flight in icing conditions.

9 - Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety? Explain.

Relative to current industry practice, the proposed standards represent an increase in the level of safety. Due to the JAA's application of NPA 25F-219 over the last ten years, current industry practice results in a level of safety that is very close to that intended by the proposed standards; the proposed standards, however, are stated in terms of legally-based regulatory requirements whereas NPA 25F-219 is essentially applied as interpretive advisory material.

10 - What other options have been considered and why were they not selected?

The only other options investigated by the FTHWG were: (1) Produce advisory material based on JAA NPA 25-219 and the public comments received against it, and (2) Introduce a paragraph in FAR/JAR 25.21 (Compliance) that would require compliance with certain Subpart B flight requirements in icing conditions and require the airplane to be capable of safe operation in icing conditions for the remaining aspects of Subpart B. The first option was rejected because of industry objections to Subpart B flight requirements being presented in advisory material that would be tied to a Subpart F rule. The second option was later rejected by FAA legal counsel because it presented intended safety objectives in the advisory material that could not be enforced.

11 - Who would be affected by the proposed change?

Airplane manufacturers will be affected by the proposed regulatory changes. Since it is currently not the intent to apply the proposed standards retroactively, airplane operators will not be affected in the short term. For future airplane types that comply with the standards being proposed for flight in icing conditions, operators may or may not be affected depending on the extent of design changes that may be incorporated by the manufacturers to ensure satisfactory handling qualities and mitigate any potential performance losses.

12 - To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?

As previously noted, the JAA's Draft AMJ 25.1419 provided the basis for development of the proposed standards; that document will be cancelled upon issuance of the final rule. Proposed advisory material in the form of an FAA AC and a JAA ACJ will complement the proposed regulatory changes. Some elements of the advisory material associated with the proposed regulatory changes were excerpted from the FAA's Advisory Circular 25-7, "Flight Test Guide for Certification of Transport Category Airplanes."

13 - Is existing FAA advisory material adequate? If not, what advisory material should be adopted?

Existing FAA advisory material is not adequate. A comprehensive package of advisory material in the form of an FAA AC and a JAA ACJ has been developed by the FTHWG in conjunction with the proposed regulatory standards. The proposed advisory material presents a suggested means of compliance with the new flight requirements of Subpart B for icing conditions and guidance for determining the appropriate ice accretions. The harmonized advisory material provided as Attachment 2 should be adopted.

14 - How does the proposed standard compare to the current ICAO standard?

The proposed standard exceeds the applicable ICAO standards.

15 - Does the proposed standard affect other HWG's?

The proposed standards do not directly affect other HWGs. However, the Ice Protection HWG is developing requirements for ice detection and protection systems and the Flight Guidance System HWG has been requested to develop requirements for the certification of autopilot systems for use in icing conditions. These working groups have been coordinating, as necessary, to ensure that the effects of one group's work does not detrimentally affect work of the other groups.

16 - What is the cost impact of complying with the proposed standard?

The change in cost relative to the current practice of joint FAA/JAA certification is not anticipated to be a great increase since manufacturers are already addressing the majority of the proposed standards through the JAA's application of NPA 25F-219. However, if the change in cost was to be determined relative to what would be required to comply with existing FAA standards for flight in icing, the change could conceivably be considerable.

17 - Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?

Yes.

18 – In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain.

The "Fast Track" process is not appropriate to this rulemaking project. This project was begun in October 1994 and, after much debate and deliberation, resulted in the completion of a FTHWG Draft NPRM and advisory material in November 1999 that still contains two non-consensus items. Everything in the rulemaking package represents new certification requirements that do not lend themselves to the "Fast Track" process.